



**National
Transportation
Safety Board**

Risky Human Behavior: Threats to Transportation Safety

**Mark R. Rosekind, Ph.D.
Board Member**

**Hyatt Lecture
Saint Joseph's University
February 19, 2013**



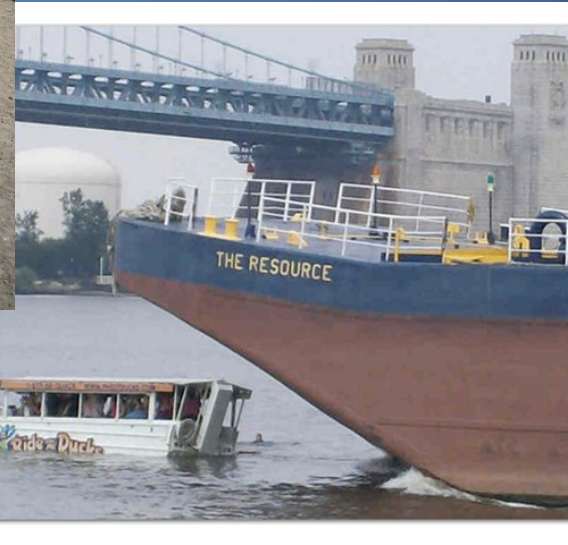
- 1) determining the probable cause of transportation accidents**
- 2) making recommendations to prevent their recurrence**



NTSB



All Modes



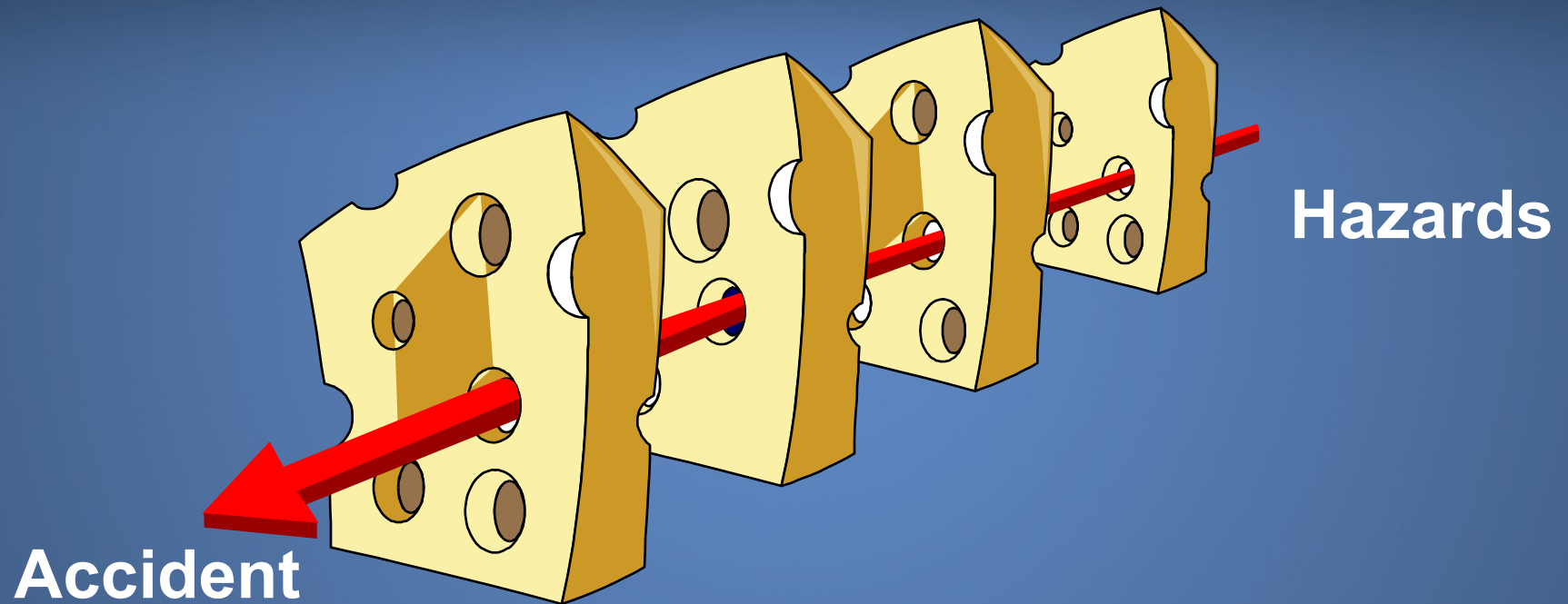
NTSB

Independent Federal Agency: Created in 1967

- > 132,000 accident investigations
- 13,500+ safety recommendations
- ~ 2,500 organizations/recipients
- 82% acceptance rate



“Swiss Cheese” Model (Reason)



Successive layers of defenses, barriers, and safeguards



NTSB

NTSB Characterized as:

‘moral compass and industry conscience’

NTSB Chairman Deborah A.P. Hersman



NTSB

Risky Human Behavior: Threats to Transportation Safety

- Fatigue
- Distractions
- Alcohol impaired driving



Guantanamo Bay Cuba

First NTSB aviation accident to cite fatigue as probable cause



- acute sleep loss, sleep debt, circadian disruption



NTSB

Observed Performance Effects

- Degraded decision-making
- Visual/cognitive fixation
- Poor communication/coordination
- Slowed reaction time



Uncontrolled In-Flight Collision with Terrain
AIA Flight 808, Douglas DC-8-61, N814CK
U.S. NAS, Guantanamo Bay, Cuba, August 18, 1993

“The National Transportation Safety Board determines that the probable causes of this accident were the impaired judgment, decision making, and flying abilities of the captain and flight crew due to the effects of fatigue...”



NTSB



National Transportation Safety Board

Animation of Accident Reconstruction

Motorcoach Run Off Road-Collision with Bridge Signpost

Interstate Highway 95 Southbound

New York, New York

March 12, 2011

HWY11MH005



NTSB

'Bronx Bus', New York, NY (March 12, 2011)



15 fatalities
17 injuries



Probable Cause

“The National Transportation Safety Board determines that the probable cause of the accident was the motorcoach driver's failure to control the motorcoach due to fatigue resulting from failure to obtain adequate sleep, poor sleep quality, and the time of day at which the accident occurred.”





**National
Transportation
Safety Board**

Track Path Animation

Collision Between Two BNSF Railway Freight Trains

Red Oak, Iowa

April 17, 2011

DCA11FR002



NTSB

Probable Cause (fatigue)

“ . . . failure of the crew of the striking train to comply with the signal indication requiring them to operate in accordance with restricted speed requirements and stop short of the standing train because they had fallen asleep due to fatigue resulting from their irregular work schedules and their medical conditions.”



Miami, OK (June 26, 2009)

10 fatalities
3 serious injuries
2 minor injuries
5 no injuries





NATIONAL TRANSPORTATION SAFETY BOARD

[HOME](#) [NEWS & EVENTS](#) [TRANSPORTATION SAFETY](#) [ACCIDENT INVESTIGATIONS](#) [DISASTER ASSISTANCE](#) [LEGAL](#) [ABOUT](#)

[Home](#) > [Transportation Safety](#) > [Most Wanted List](#)

[SHARE](#) [f](#) [t](#) [e](#) [...](#)

MOST WANTED LIST

A program to increase the public's awareness of, and support for, action to adopt safety steps that can help prevent accidents and save lives. The following are ten of the current issues.



Addressing Human
Fatigue



General Aviation
Safety



Safety Management
Systems



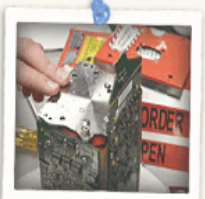
Runway Safety



Bus Occupant Safety



Pilot & Air Traffic
Controller
Professionalism



Recorders



Teen Driver Safety



Addressing Alcohol-
Impaired Driving



Motorcycle Safety



NTSB

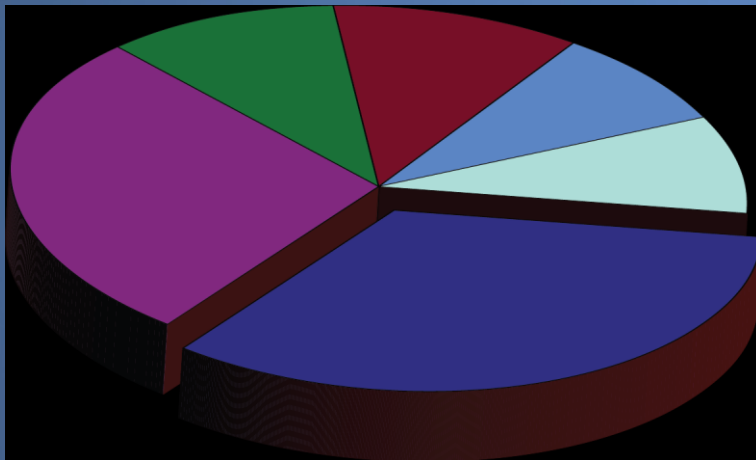
NTSB Safety Recommendations: Fatigue

- MOST WANTED 1990 - 2012
- ~200 fatigue recommendations



Complex Issue:

Requires Multiple Solutions



- Scheduling Policies and Practices
- Education/Awareness
- Organizational Strategies
- Healthy Sleep
- Vehicle and Environmental Strategies
- Research and Evaluation



Risky Human Behavior: Threats to Transportation Safety

- Fatigue
- Distractions
- Alcohol impaired driving



Distraction: 10 Years of NTSB Investigations



NTSB

Minneapolis, MN (October 21, 2009)



- A320 overflow destination
- 1 hour 17 minutes; over 100 miles



NTSB

Minneapolis, MN (October 21, 2009)

The National Transportation Safety Board has determined that Northwest Airlines flight 188 overflowed its destination airport of Minneapolis by more than 100 miles and failed to maintain radio communications because the pilots became distracted by a conversation unrelated to the operation of the aircraft.



Collision of Metrolink Train 111 With
Union Pacific Train LOF65-12
Chatsworth, California
September 12, 2008



Accident Report

NTSB/RAR-10/01

National Transportation Safety Board

PB2010-916301



**National
Transportation
Safety Board**



NTSB

Chatsworth, CA (September 12, 2008)

- ~ 4:22 p.m., PDT, westbound Metrolink train, one locomotive and three passenger cars, collided head-on with eastbound freight train
- Metrolink train derailed its locomotive and lead passenger car
- the freight train derailed its 2 locomotives and 10 of its 17 cars
- the force of the collision caused the Metrolink train to telescope into the lead passenger coach by about 52 feet

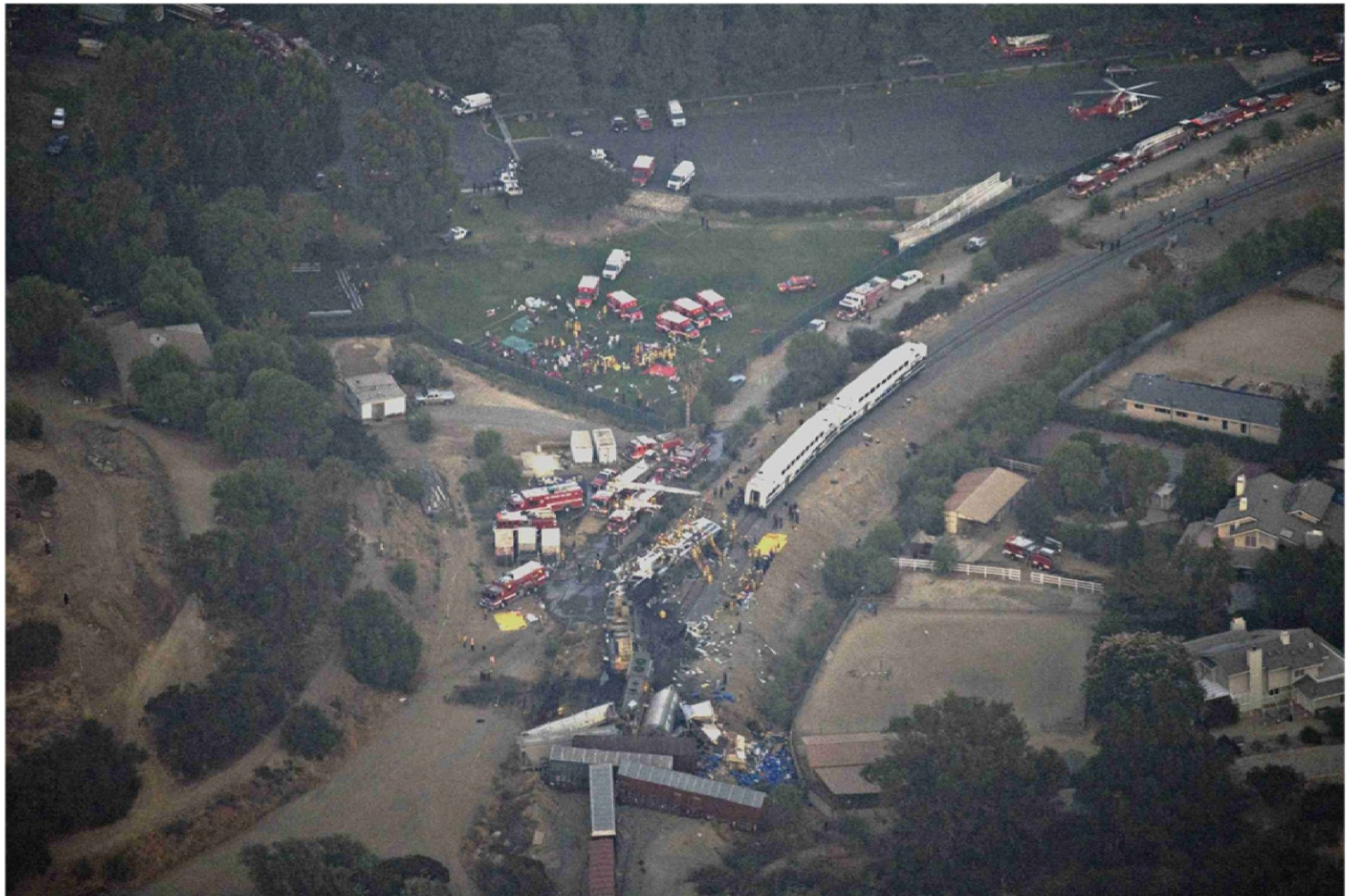


Chatsworth, CA (September 12, 2008)

- Metrolink engineer's wireless records on day of accident:
 - sent/received 95 text messages
- during time responsible for train operation:
 - sent 21 text messages, received 21 text messages, 4 outgoing calls
- 28 day review: use on day of accident consistent with previous use



Chatsworth, CA (September 12, 2008)



Survival Factors Factual Report - Photo 9 - Aerial view of accident area (Metrolink)

25 fatalities, 135 injuries



NTSB

Chatsworth, CA (September 12, 2008)



25 fatalities, 135 injuries



NTSB

Probable Cause

“ . . . failure of the Metrolink engineer to observe and appropriately respond to the red signal . . . because he was engaged in prohibited use of a wireless device, specifically text messaging, that distracted him from his duties.”



Alexandria, VA (November 14, 2004)



11 injuries



NTSB

Probable Cause

“ . . . bus driver’s failure to notice and respond to posted low-clearance warning signs and to the bridge itself due to cognitive distraction resulting from conversing on a hands-free cellular telephone while driving.”



Truck-Tractor Semitrailer Median Crossover
Collision With 15-Passenger Van
Munfordville, Kentucky
March 26, 2010



Accident Report

NTSB/HAR-11/02
PB2011-916202



**National
Transportation
Safety Board**



NTSB

Munfordville, KY (March 26, 2010)

- truck-tractor semitrailer combination unit
- departed the left lane of southbound Interstate 65
- crossed a 60-foot-wide median
- struck and overrode a cable barrier system
- entered the northbound travel lanes
- struck a 15-passenger van
 - 11 passengers (eight adults, two children, infant)



Munfordville, KY (March 26, 2010)

- driver used his mobile phone for calls and text messages a total of 69 times while driving in the 24-hour period prior to the accident
- driver made four calls in the minutes leading up to the crash
- last call at 5:14 a.m. CDT, coinciding with the time that the truck departed the highway





- crossed 60 ft median
- overrode cable barrier

Fatalities

- truck driver
- van driver
- 9 van passengers



Probable Cause

“ . . . the truck driver’s failure to maintain control of the truck-tractor combination vehicle because he was distracted by use of his cellular telephone.”



Multivehicle Collision
Interstate 44 Eastbound
Gray Summit, Missouri
August 5, 2010



Accident Report

NTSB/HAR-11/03
PB2011-916203



**National
Transportation
Safety Board**



NTSB

Gray Summit, MO (August 5, 2010)

- pickup driver cell phone use:
 - 11 minutes prior to accident, 11 text messages (6 sent/5 received)
- witness: driver appeared to lean to right
- witness: did not see brake lights illuminate
- pickup's sensing and diagnostic module (SDM):
 - brakes not applied in seconds before impact





2 fatalities
37 injuries



NTSB

New Recommendations

To the 50 states and the District of Columbia:

(1) Ban the nonemergency use of portable electronic devices (other than those designed to support the driving task) for all drivers;



NTSB

Philadelphia, PA (July 10, 2010)



2 fatalities, 26 injuries



NTSB

Risky Human Behavior: Threats to Transportation Safety

- Fatigue
- Distractions
- Alcohol impaired driving





NATIONAL TRANSPORTATION SAFETY BOARD

[HOME](#) [NEWS & EVENTS](#) [TRANSPORTATION SAFETY](#) [ACCIDENT INVESTIGATIONS](#) [DISASTER ASSISTANCE](#) [LEGAL](#) [ABOUT](#)

[Home](#) > [Transportation Safety](#) > [Most Wanted List](#)

[SHARE](#) [f](#) [t](#) [e](#) [...](#)

MOST WANTED LIST

A program to increase the public's awareness of, and support for, action to adopt safety steps that can help prevent accidents and save lives. The following are ten of the current issues.



Addressing Human
Fatigue



General Aviation
Safety



Safety Management
Systems



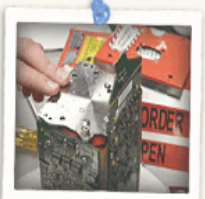
Runway Safety



Bus Occupant Safety



Pilot & Air Traffic
Controller
Professionalism



Recorders



Teen Driver Safety



Addressing Alcohol-
Impaired Driving



Motorcycle Safety



NTSB

Carrollton, KY (May 14, 1988)



67 passengers, 27 fatalities, 34 serious injuries; driver: .28 BAC



NTSB

Since 1988 . . .

- 300,000 lives lost
- millions injured
- 200 law enforcement lives lost



Alcohol Impaired Driving

- 2010: 10,228 fatalities, 345,000 injuries
- 31% of fatal crashes
- > 4X total of all other modes
- Daily fatalities > 27 in deadliest crash
- Annual economic cost: \$130+ billion



Alcohol Impaired Driving

- NHTSA:
 - estimates 88 impaired trips before being arrested once
 - repeat offender:
176 trips before being caught!



Alcohol Impaired Driving

- Strong laws
- Education
- High visibility enforcement
- Technology innovations
 - ignition interlock
 - DADSS
- Systems interventions
 - DWI courts



Incline Village, NV – Feb 2007



urine ethanol: 0.279 percent; chest blood ethanol 0.155 percent



NTSB

Honorable John K. Lauber:

No Accident \neq
Safe Operation



NTSB

Manage Human Behavior = Enhance Safety

- Promote change:
 - safety culture
- Acknowledge risk
- Act!





National Transportation Safety Board